

Homestead Non-Native, Invasive Plants (Weeds) Analysis

Prepared by: Claudia U. Rumold, Botanist, Idaho Panhandle National Forest

For: St. Joe Ranger District, Idaho Panhandle National Forests

January, 2020

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotope, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer and lender.

The Forest Service uses the most current and complete data available. Geographic information system (GIS) data and product accuracy may vary. They may be developed from sources of differing accuracy, accurate only at certain scales based on modeling or interpretation, incomplete while being created or revised, etc. Using GIS products for purposes other than those for which they were created may yield inaccurate or misleading results. If a map contains contours, these contours were generated and filtered using the Digital Elevation Model (DEM) files. Any contours generated from DEMs using a scale of less than 1:100,000 will lead to less reliable results and should only be used for display purposes. For more information contact the St. Joe Ranger District at 222 S. 7th Street Suite 1, St. Maries, Idaho, 83861; (208)245-2531.

Reported mileages are estimates and may vary depending on how they are rounded and what models and equations they are used for or result from.

Introduction – Non-Native, Invasive Plants (Weeds)

Definitions

Noxious weeds are non-native, invasive plant species that have been officially designated as such by Federal, State, or County officials. In *Weeds of the West*, a weed is defined as “a plant that interferes with management objectives for a given area of land at a given point in time” (Whitson et al. 1992). The Federal Noxious Weed Act of 1974 defines a noxious weed as “a plant which is of foreign origin, is new to, or is not widely prevalent in the United States, and can directly or indirectly injure crops or other useful plants, livestock or the fish and wildlife resources of the United States or the public health” (P.L. 93-629).

The Idaho Noxious Weed Law defines a “noxious weed” as any non-native plant species already established in, or introduced to the State, which may render land unsuitable for agriculture, forestry, livestock, wildlife, or other beneficial uses and is further designated as either a State-wide or County-wide noxious weed (Idaho Code 24 Chapter 22). Both Federal and State laws define noxious weeds primarily in terms of compromising commodity uses of the land. Increasingly, though, the impacts of non-native, invasive species on non-commodity resources—such as water quality, wildlife, and biological diversity are also of concern.

Purpose of this report

This report was prepared in accordance with Forest Service Manual FSM 2900, Invasive Species Management (USDA 2011). Forest Service direction in FSM 2903.4 states: “Determine the risk of introducing, establishing, or spreading invasive species associated with any proposed action, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval.”

This report analyzed the existing condition of the project area and the risks and effects of invasive plant introduction and spread associated with the proposed action. All alternatives comply with Forest Service policy and direction contained in FSM 2900. See pages 13-15 of this report for pertinent regulatory frameworks and compliance.

Habitat vulnerability and non-project dependent vectors

The spread of non-native, invasive plants (referred to here as weeds) can in large part be attributed to human-caused dispersal (e.g., by way of vehicles and roads) (Roche and Roche 1991), contaminated livestock feed, contaminated seed for revegetation, and ineffective revegetation practices on disturbed lands (Callihan et al. 1997). The introduction and encroachment of species such as Canada thistle, Dalmatian and Yellow toadflaxes, and Spotted knapweed have had negative economic and environmental repercussions, for instance, outcompeting native flora and reducing native biodiversity (Vallentine 1989). These weed species have been established throughout the St. Joe Ranger District (RD), along travel routes (roads, trails) and associated with timber harvest units (e.g., within units, at access points, at landings).

Vulnerability to non-native, invasive species invasion and establishment is greatly influenced by plant cover, soil cover, and overstory shade. Open habitats (low to no canopy cover) are more vulnerable to weed establishment, which do well in sunny conditions. Moreover, any habitat is made more vulnerable by soil disturbance, which provides ideal conditions for pioneer species like weeds to out-compete native plants.

Any activity that has the potential to move soil or plant parts (e.g., weed seeds, propagules, and other reproductive parts) from one location to another has the potential to act as a vector and facilitate weed introduction and invasion. Non-project dependent activities that can act as vectors include (but are not limited to): past and ongoing roadwork, woodcutting, timber management, motorized vehicle use, wildfire suppression, and recreational activities. The areas at greatest risk to weed introduction/establishment are those located next to roads. Roads provide for the dispersal of weeds via three mechanisms: providing habitat by altering conditions, making weed infestation more likely by stressing or removing native vegetation, and allowing easier movement of weeds by wild or human vectors (Trombulak and Frissell 2000).

In northern Idaho, most weed species are seen to proliferate in early successional stages, but reduce in density as the canopy cover increases (Zack 1999). However, meanwhile, existing weed populations serve as seed sources for future expansion of infestations. Specifically, species like Spotted Knapweed and St. John's Wort produce seedbanks: large quantities of seed that remain dormant in the soil for many years, until disturbance creates conditions favorable for their germination and growth. As discussed below, disturbed soils and dry, sunny conditions are favored by weeds.

Forest weed management strategy

In accordance with the 2015 Forest Plan and the St. Joe RD Noxious Weeds Final Environmental Impact Statement (USDA 2000), the overarching district strategy with respect to weed management is to contain current weed infestations and prevent the spread of weeds to vulnerable, but generally uninfested, areas. As part of this approach, weed management aims to:

- Protect the functionality and biodiversity of the St. Joe ecosystem by preventing or limiting the spread of non-native, invasive species that may displace native vegetation
- Eliminate new/potential invader species before they become established (i.e., prioritize their treatment over that of widespread weeds (see Appendix 1)
- Protect sensitive and unique habitats (e.g., areas of documented threatened, endangered, and sensitive; specially designated areas, like Research Natural Areas (RNAs))
- Reduce weed sources at common areas of dispersal, like recreation sites (campsites, trailheads) and travel routes
- Comply with Federal and State laws regulating the management of invasive species.

Methodology

Analysis Area and Temporal Scope

The Homestead project is located on the St. Joe RD of the Idaho Panhandle National Forest, in Shoshone County near Avery, Idaho. The project area comprises approximately 16,757 acres, of which 16,717 acres are National Forest System lands. The project area constitutes the spatial boundary for the analysis of direct, indirect, and cumulative effects to weeds from the proposed action.

Short-term temporal effects last from time of implementation to five-to-eight years after the last activities take place. After this time, most short-term effects are expected to diminish. Long-term effects may be evidence 20+ years after the last implementation of project activities. Long-term effects may exceed 50 years, but predicting effects at this timescale is too speculative for reliable analysis.

After circa 20 years, post-activity vegetation recovery (i.e., increased canopy cover), weed control efforts, and restoration would inhibit weed growth to a certain degree. At the same time, some weed species have seeds that remain viable in the soil for several years. For instance, Spotted knapweed is characterized by as much as 5% seed viability after 7 years. And under field conditions in the area of Spokane, Washington, researchers estimate Dalmatian toadflax seed longevity at 10 years, with duration of viability dependent on soil and climatic conditions (USFS 2013). Such seed longevity permits these species to take advantage of future habitat alteration/disturbance.

Resource Indicators and Measures

Certain proposed project activities may contribute to the introduction of new weed species and the spread of existing infestations in the project area. These include:

- Equipment used in logging, aquatic restoration, and roadwork could spread existing weeds within the project area and inadvertently introduce new invasive plant seeds and propagules from other sites to the project area
- Timber harvesting increases sunlight reaching the understory (by removing canopy) and causes soil disturbance. Both of these factors create conditions favorable for weed species' establishment and spread.

Table 1. Resource indicators and measures for assessing effects to invasive weeds

Resource indicator	Measure	Source
Ability to treat weeds as directed in Forest Plan and to implement early detection/rapid response	NEPA coverage areas	Forest Service Manual FSM 2900, Invasive Species Management (USDA 2011). Forest Plan 2015, NF DC- Veg 10, FW-OBJ-Veg-02)
Reduction in canopy cover	Acres/ miles	
Soil disturbance	Acres/ miles	

Information Sources

Plant surveys were conducted in the project area in 2018–2019 in areas of proposed ground disturbance (logging units, areas of roadwork). All plant species encountered were documented (see project file for survey records) and the location of weed infestations were recorded. The Forest Service Activity Tracking System (FACTS) database provided data regarding previously documented weed infestations and weed treatment activities.

Methods

The risk of weed spread and of the introduction of new/potential invader species from the proposed activities is estimated based on peer-reviewed scientific literature on the topic and professional judgement. Although difficult to quantify, cumulative effects to weeds from proposed activities may be described as follows:

- Very low = no measurable effect on existing weed infestations or susceptible habitat
- Low = existing weed infestations and/or susceptible habitat not likely affected
- Moderate = existing weed infestations or susceptible habitat affected, with the potential for expansion into uninfested areas and/or establishment of new invaders

- High = weed infestations and/or susceptible habitat affected, with a high likelihood of expansion into uninfested areas and/or establishment of new invaders.

Affected Environment

This section describes the existing conditions in the project area as related to weeds. An understanding of existing conditions (as created by past, present, and reasonably foreseeable factors) is necessary in order to be able to gauge the interaction between these and project-related variables.

The following table lists the weed species documented in the project area, as well as their ranking and associated treatment strategy.

Table 2. Weed species documented in the project area

Species	Common name	Forest Service Ranking	Treatment objective
<i>Centaurea stoebe</i> <i>ssp. micranthos</i>	Spotted knapweed	Widespread	Contain within infested area and reduce plant populations
<i>Cirsium arvense</i>	Canada thistle		
<i>Cirsium vulgare</i>	Bull thistle		
<i>Cynoglossum officinale</i>	Houndstongue		
<i>Hieracium aurantiacum</i>	Orange hawkweed		
<i>Hieracium caespitosum</i>	Meadow/ Yellow hawkweed complex		
<i>Hypericum perforatum</i>	St. John's Wort (Goatweed)		
<i>Leucanthemum vulgare</i>	Oxeye daisy		

As is the case for northern Idaho in general, the project area has a long history of land management, including over a dozen timber harvests going back to the 1950s and totaling approximately 1,950 acres (see past, present, and reasonably foreseeable future table: timber activities). Weed infestations are currently located mainly along roads (see project record for specific location data) and include only species classified by the forest as widespread (versus “potential” or “new invaders”) (see Table 2 and Appendix 1). As discussed in the Introduction to this report, the weeds’ roadside location largely reflects 1) their mode of entry to, and spread within, National Forest land as a result of past management activities like logging and roadwork, along with past and ongoing motorized vehicle use by the public and 2) their adaptation to open, disturbed environments.

Of the 16,757 acres comprising the Homestead project area, 125 acres are privately owned. Activities taking place on private land are likely past and ongoing factors contributing to the risk of weed invasion and establishment in the project area (e.g., soil disturbance and canopy removal associated with roadwork, road use, and logging on private land). However, given the small percentage of the project area that is privately owned, the scale of contribution of such activities to weed introduction/ establishment in Homestead has been and continues to be low.

Domestic and wild animals can contribute to weed establishment/spread. No grazing allotments are located in the project area, such that contaminated livestock feed is not a factor contributing to weed invasion/spread in the project area. However, to a limited extent, wild animals may also inadvertently contribute to weed spread, for instance, by consuming weed seed heads and fruits and depositing them

with their waste elsewhere in the forest. Additionally, weed seeds can adhere to animal fur and be transported in this way. Houndstongue (widespread on the forest overall, but limited in distribution on the St. Joe district) is particularly susceptible to this mode of transmission because of its burr-like seeds.

The annual district program of weed control prioritizes weed treatments across the St. Joe RD according to species ranking and available funding. From 2014 to 2019, weed management efforts in the project area totaled approximately 80 acres (with treatments along sections of Forest Service Roads 216, 321, 490, 1913, and 1936. In 2020, weed treatments contracted through the Good Neighbor Authority will take place along Forest Service Roads (FSR) 216, 321 and 1936. Additionally, the St. Joe RD will treat along FSR 1913 and conduct monitoring and possible treatment along FSR 1914 and 1938.

As seen in Table 2, all weed species documented in the project area are classified as ‘widespread’ (see also Appendix 1). Nevertheless, on the St. Joe RD, Houndstongue has been prioritized for treatment (i.e., recent and planned 2020 treatments along FSR 1913) because of its fairly restricted distribution on this district and because of the ability of this species to spread beyond roadsides by adhering to animal fur. See the Botany-Weeds project record for an account of the district’s focus on Houndstongue control and its efficacy (Heise 2017).

Environmental Consequences

No Action

Direct and Indirect Effects

Weed Introduction and Spread via Equipment on Roads

Under the No Action Alternative, roads and trails in the project area would continue to serve as vectors for weed invasion/spread. Motorized recreation vehicles introduce weed reproductive parts to the project area. The on- and off-road (authorized and unauthorized) motorized activities disturbs soils and creates wind gusts, thereby creating habitat vulnerable to weed establishment and moving weed seeds, respectively.

No road decommissioning would take place to remove unused road segments from the system. These systems would continue to provide habitat for weed infestations, as well as contributing to the existing weed seedbank within the project area.

Disturbance from Vegetation Management and Associated Activities

No logging, fuel reduction, roadwork, or other associated activities would take place under the No Action alternative. Weeds would likely remain confined to their current locations along travel routes—at the most perhaps extending into areas of decreased canopy cover adjacent to roads/trails. In the case of the project area, proposed treatment units are located in moist forest habitat. Consequently, no adverse direct or indirect effects are expected related to weed spread because of a lack of forest management activities.

Under the No Action alternative, a lack of the proposed vegetation management activities would contribute to continued fuel loading in the project area. This might indirectly increase the risk of a high severity wildfire and severely burned areas would have more areas of exposed mineral soil, which is more susceptible to weed invasion. Although it is not possible to predict the occurrence of a wildfire, the fire suppression activities associated with such an event would increase the risk of the introduction of new

weed sources and species hitchhiking on vehicles/equipment and the soil disturbance caused by machinery (e.g., making fire lines) would further alter habitat in a way favoring weed encroachment.

Cumulative Effects

The cumulative effects analysis for the No Action alternative considered the effects of past, present, ongoing, and reasonably foreseeable activities to weed introduction/spread.

Past activities have led to habitat modification and fragmentation in and around the project area. Activities and events that have likely contributed to the past introduction and establishment of weeds in the area include roadwork (construction, decommissioning, and maintenance), timber harvest, prescribed burns, vehicular traffic, recreational uses, and wildfires. To a degree, past efforts by the district weed treatment program have been effective in temporarily reducing and/or containing individual weed infestations.

Given existing weed populations, their associated seedbank, and ongoing activities, there is a continued moderate risk of the introduction to and spread of weeds within the project area. Current ongoing and reasonably foreseeable activities include fire suppression, non-commercial thinning, white pine pruning, road maintenance, permitted outfitter and guide activities, public firewood gathering, public use of motorized vehicles, and other recreational activities such as berry-picking, hunting, and hiking. These activities could result in new disturbed sites available for colonization by weeds. Ongoing use of the road system in the project area by motorized vehicles will continue to add to weed introduction and spread. The district weed treatment program will continue its efforts contingent on funding and priorities.

Under the No Action alternative, cumulative effects to forest stands experiencing high insect and root disease-related mortality may be low to moderate in the event of a wildfire. Following a fire, nearby weed infestations may spread into burned areas by way of wind and animal vectors. Also, the fire and consequent disturbed soils may provide ideal habitat conditions for the growth of weeds from existing seedbanks. Moist to wet forest habitat typically burns less intensely than drier forest and the fire interval is long for the former. Effects from wildfire to moist forest habitat, such as is found in the proposed treatment areas, would be low to moderate with respect to weed invasion/spread.

Cumulatively, the effects of the No Action alternative—in combination with past, ongoing, and reasonably foreseeable actions—would be low because no soil disturbing activities would take place and district weed treatments would continue.

Proposed Action

The Homestead project includes approximately 1,170 acres of regeneration harvest, 49 acres of commercial thinning, fuel reduction for treatment acres following timber removal, roadwork, and expansion of rock stockpile areas (Table 3). Additionally, Whitebark pine restoration is proposed for 202 acres, by way of low-intensity prescribed burning.

Table 3. Environmental effects of Proposed Action

<i>Measure</i>		No Action	Proposed Action
<i>Weed introduction & spread with equipment via roads (miles)</i>	New road construction	0	4
	Non-system roads to be added to NFS	0	2.7
	Temporary road construction	0	2.9
	Road reconstruction	0	5.2
	Road maintenance	0	32.7
	Road decommissioning	0	25.8
	Road storage	0	12.5
<i>Soil disturbance & changes to light/ moisture regime from vegetation treatments (acres)</i>	Even-aged regeneration harvest	0	1,170
	Commercial thinning	0	49
	Fuel reduction activities	0	1,219
	Whitebark pine restoration	0	202
<i>Weed introduction/ spread via increase in size of stockpiles areas (acres)</i>	Location 1 (from 0.70 to 1.72 ac.)	0	1.02
	Location 2 (from 0.31 to 0.60 ac.)	0	0.29
	Location 3 (0.2 to 1.64 ac.)		1.44

The following design features would be implemented as part of the proposed action in order to reduce the spread of existing invasive weeds and prevent the introduction of new/potential invader species within the project area:

Design Features

In accordance with the St. Joe Noxious Weed Control Environmental Impact Statement (Record of Decision, October 12, 1999), the following measures would be taken to help reduce the spread of existing weeds and prevent the introduction of new invader weed species:

- Treatment would be implemented in accordance with priorities set by the noxious weed program if new populations of noxious weeds are found. New invader species would be targeted for eradication immediately upon discovery. All construction and timber sale contracts would include a provision for effective equipment washing to remove soil and any adhering plant parts (seeds, propagules)
- In adherence to guidelines provided by the St. Joe Noxious Weeds Final Environmental Impact Statement and Record of Decision (USDA Forest Service, 1999), measures to protect TES plant population viability and habitat capability would be implemented during weed treatment
- Glyphosate would not be used to treat weeds in the project area
- Weeds would be treated on existing roads proposed for storage or decommissioning, if roads are not brushed in prior to storage/decommissioning
- The timber sale contract would include a provision for herbicide spraying of existing weeds on roads used during the timber sale before and after log hauling

Homestead Project: Weeds Risk Analysis

- Timber sale contract provisions would require purchaser/contractors to seed and fertilize areas of soil disturbance associated with skid trails and landings, using a site-appropriate seed mix approved by an agency botanist at the time of contract preparation
- All plant materials used in the project, including grass seed and mulch, would be certified noxious-weed free. Grass seed would be certified, blue-tagged, seed
- Where deemed appropriate by the project administrator or botanist, mulching or use of on-site slash would be part of revegetation efforts and included as part of contract provisions
- Use of native plant materials is required for restoration projects (FSM 2070.3, Amendment 2008). Locally-obtained materials are preferred, but if unavailable or economically unfeasible, appropriate materials that meet Region 1 guidelines (Northern Region Native Plant Handbook, 1995) may be substituted
- After implementation, project areas would be monitored for new populations of noxious weeds. If new populations are found more intensive surveys would be conducted, sites would be mapped, and treatment would be scheduled.
- Weed treatments would be monitored for effectiveness

Direct and Indirect Effects

The various activities comprising the Proposed Action have differing specific direct and indirect effects, outlined below. However, overall, the risk of spread of existing weed populations from project-related activities can be classified as low, moderate, or high and depends largely on the proximity of a weed source to areas of disturbance, current site conditions, and the degree of soil disturbance and canopy removal resulting from project activities. For instance, pre-commercial thinning, which does not result in soil disturbance and decreases canopy cover only marginally poses a very low to low risk. The following activities, which result in limited soil disturbance/ displacement and/ or limited changes to canopy cover pose a moderate risk: skyline harvest systems; thinning (uneven-aged) silvicultural treatments; prescribed burning; and road maintenance, improvement, reconstruction, and decommissioning. A moderate to high risk is posed by activities that result in substantial soil disturbance/ displacement and reduction in canopy cover: regeneration (even-aged) silvicultural treatments, ground-based logging systems, and new road construction. Project design features (such as those describe above) can reduce, but do not eliminate, these risks.

Design features such as contract provisions requiring the cleaning of harvesting equipment and road construction equipment prior to entry to the sale area can reduce the risk of introduction of new weed species, but cannot eliminate this risk. Similarly, seeding of disturbed sites (landings, roads proposed for storage and decommissioning) can help to reduce, but not eliminate, the risk of establishment of new weed populations. Finally, monitoring/ treatment of newly detected infestations on NFS lands can help to reduce the risk of establishment of new weed populations. Nevertheless, the risk of establishment of new invaders to the project area is moderate, even with implementation of required design features.

Weed Introduction/Spread by Equipment and via Roads/ Stockpile Areas

As discussed in the Affected Environment section, weeds are currently widespread along roads and trails in the project area. Weeds became established before the Forest Service required measures (i.e., ‘best management practices’ or ‘BMPs’) to reduce their introduction and spread as a consequence of management activities. As noted, key mechanisms of spread have included road maintenance, motorized

Homestead Project: Weeds Risk Analysis

use, and timber sales. Additionally, in the past, the Forest Service used grass seed mixes including species now considered undesirable because they are non-native and persistent.

Effects to weeds by roads may be both direct and indirect. Weeds may be directly introduced by being carried in on equipment/vehicles. The open, disturbed conditions along road corridors indirectly encourage weed establishment and spread. For instance, the continued soil disturbance and wind generated by motorized vehicle use further perpetuates habitat conditions favorable for these species.

Project design features stipulate that all construction equipment would be cleaned before entry onto Forest Service lands, according to provisions in the timber sale and roads contracts. Roads that are used in the timber sale would be treated with herbicides before and after logging. Brushed-in roads that are not accessible by spray equipment would not be sprayed before reconstruction, storage, or decommissioning. These required design features would reduce, but not eliminate, weed introduction and spread.

Typically, multiple herbicide treatments are necessary to control weed infestations, because of the soil seedbank that accompanies existing weed populations. The weed management program on the district is focused on system road right-of-ways and future weed treatment is planned for the project area. Nevertheless, infestations resulting from project-related road management activities may not be contained or controlled in years subsequent to proposed management activities due to funding/competing priorities.

Indirectly, over an estimated period of 20 years, native vegetation on stored and decommissioned roads would re-establish, shading out most invasive species that may have become established. However, certain species, like Hawkweeds, are shade tolerant and could remain until released by disturbance.

New, temporary, and non-system roads

All roadwork activities involve machinery and soil disturbance and consequently, run the risk of weed introduction to/spread within the project area. The current, widespread presence of weeds in the project area and the use of roads during and, in some cases, following project implementation, means that even if the design feature requiring the cleaning of machinery/equipment used in roadwork is effective, existing weeds may nevertheless be moved along these roads from one part of the project area to another (by equipment, vehicles, and animals).

The proposed new system road construction would permanently affect 4 miles. The new permanent roads would be accessible to administrative motorized use only and would be closed to public motorized use with gates or barriers. This means that their role as vectors for weed spread would be mitigated to a certain degree, although the road habitat would nevertheless be suitable for weed encroachment.

The proposed 2.9 miles of temporary roads would serve as vectors and suitable habitat for weed invasion/spread in the short term. Following implementation, temporary roads would be rehabilitated (de-compacted and re-countered to the approximate contour of surrounding terrain and then seeded or covered with logging slash/other debris to prevent erosion and to accelerate hydrologic and vegetative recovery.

The proposed addition of 2.7 miles of non-system road to the National Forest System would increase the risk of weed introduction/spread.

Road reconstruction and maintenance

Approximately 5.2 miles of existing stored roads would be reconstructed in order to make them suitable for log hauling, according to the current Idaho forest practices standards for water quality. Reconstruction

activities would include brushing, short segments of realignment, widening, adding turnouts, and improving or adding drainage structures.

Maintenance would occur for 32.7 miles of road. Activities would include brushing, blading and shaping, cleaning ditches and culverts, improving drainage structures, and adding gravel to surfaces. Some minor areas of reconstruction (see above for reconstruction activities) may be necessary to address drainage and/or safety issues.

Non-system road decommissioning and road storage

The Proposed Action includes 12.5 miles of road storage and 25.8 miles of road decommissioning, following project implementation. Road storage and decommissioning have the potential to contribute to weed spread in the short term, because some of the roads are currently infested with weeds. Weeds would be treated before roads are stored or decommissioned, where roads are not currently brushed in.

Decommissioning not involving earth-moving (i.e., soil disturbance) would have no direct impact to weeds and would likely have long-term benefits, as the shrub layer would increase over time, eventually making vehicular traffic impossible on these sections. Culvert removal would affect moist and wet forest habitat (present in the project area) to a certain degree, but is considered low risk with respect to weeds. Road decommissioning involving earth-moving carries a greater risk with respect to weed invasion, but this is a short-term effect that dissipates once vegetation becomes established.

In the long term, the proposed non-system road decommissioning and long-term storage would decrease the mileage that could serve as a future vector to weed spread by 25.8 and 12.5 miles, respectively.

Stockpile areas

Three rock stockpile locations will be used to store rock quarried and crushed within the project area (see EA for location description). These will be located in areas previously used for landings, dispersed camping, and other administrative uses and are therefore generally disturbed areas. As shown in Table 3, these areas will increase by approximately 2.75 acres (from a total of 1.21 to 3.96 acres). In light of their role as temporary stockpile locations for rock to be used in project-related roadwork involving machinery, these areas can be considered like roads in their role as vectors for the transmission of weeds: vehicles and machinery moving to and from the stockpile areas may introduce weeds/ weed parts and carry these to different parts of the project area during implementation. Their proposed use as camping sites, firefighting staging areas, and/ or re-use as decking areas following project implementation means that they would remain disturbed habitats and therefore continue to serve as vectors for the transmission of weeds.

Weed Introduction/Spread related to Disturbance from Vegetation Management and Associated Activities

The proposed logging and associated activities carry a risk of directly and indirectly increasing the risk of weed introduction and spread. For the most part, effects to weeds these activities are indirect and cumulative, rather than direct.

As noted, herbicide treatment of roads used in the timber sale before/after logging and cleaning of construction equipment are two design features of the Proposed Action. These would help to reduce, but not totally eliminate, weed invasion/spread due to project activities. For instance, despite cleaning requirements, it is still possible that vehicles/equipment inadvertently directly introduce new weed seeds/propagules to the project area. Moreover, although herbicide treatments are effective in reducing

existing weed populations, they cannot necessarily eliminate them completely (particularly a single treatment, e.g., pre-hauling). Consequently, a weed source would still exist and seeds/propagules could be moved by project-related vehicles and machinery from an infested to an uninfested area, thereby spreading weeds within the project area.

Indirect effects from the Proposed Action concern the creation of habitat suitable for weeds through soil disturbance and canopy removal. In addition to the soil disturbance caused by timber harvest, burning, and related activities, the removal of the tree canopy by logging would further indirectly alter habitat conditions in the proposed treatment units, changing the light-moisture regime in these areas and creating drier, sunnier conditions in the understory. Prescribed burning runs the risk of exposing bare, mineral soils. The combination of disturbed soils and sunny, dry conditions is favored by the majority of the weeds that have established themselves in northern Idaho.

This indirect effect to habitat would diminish to a certain degree in the long term, when the regeneration of conifer stands and associated native shrub and other understory vegetation would create shadier, moister conditions not favorable to most weed species. Nevertheless, an overall increase in the presence of weeds may result from the proposed activities, as certain weeds can tolerate shade (Hawkweeds), sunnier microsites continue to support weed populations, and the soil seedbank from existing populations can support regrowth under future conditions of disturbance. Ongoing weed treatments (one of the project design features) would aid in reducing weed presence in some of the most vulnerable habitats (e.g., roads and landings).

Under the Proposed Action, regeneration harvest would be conducted on 1,170 acres in the project area. Regeneration harvest is a type of logging that removes most of the overstory, such that these acres would provide drier, open habitat suitable for weeds until tree seedlings grow big enough to shade the ground. Commercial thinning is proposed for 49 acres. Fuel reduction activities are proposed for 1,219 acres following timber harvest.

The various proposed activities differ in the nature and level of risk that they hold for weed invasion and establishment. Also, weed species' responses to different activities differs, although understanding of this dynamic is incomplete.

Timber harvest

Under the Proposed Action, regeneration harvest would be conducted on 1,170 acres in the project area, removing most of the overstory from these acres. The proposed use of skyline harvesting for 213 acres (18% percent) of the treatment acres, along with the retention of coarse and woody debris (Soils design feature #5), would help to minimize soil disturbance/compaction and maintain soil productivity and ecological function to a degree. Nevertheless, the drier, sunnier conditions following harvest would make these areas more vulnerable to weed establishment. In particular, proposed regeneration harvests would create 7 openings greater than 40 acres (totaling ~970 acres); these larger areas of disturbed soils and drier, sunnier conditions would be more vulnerable to, and take longer to recover from, weed encroachment.

Fuel reduction

Fuels reduction would be implemented in all units following logging (for a total of 1,219 acres). Grapple pile and burn is proposed for 879 acres, broadcast burn for 220 acres, and jackpot burn for 120 acres.

Fuels reduction activities would directly affect some weed species and may indirectly affect some habitats, making them more susceptible to weed invasion.

A ground-based, mechanical method of fuel treatment, grapple piling would disturb the soil and provide habitat for weed invasion, with no further preventative measures. There is also the potential for equipment to spread weed seeds from infested sites to newly-disturbed ground, but grapple piling would be limited to the skid trails used for timber harvest. Contract provisions for construction equipment washing would reduce the risk of weed introduction from outside the forest, but would not necessarily be able to address all spread between uninfested and infested parts of the project area.

Prescribed fire

Prescribed fire would be used to prepare regeneration harvest units for planting and to reduce fuels in these units. Prescribed fire may result in exposure of mineral soil, which would create a suitable seedbed for weed introduction. As noted, weed populations are documented in the project area, constituting a ready seed source. Although many of the weeds species documented in the project area invade after site preparation, they tend to decrease as the site becomes stocked with planted conifers and native vegetation. This is a long-term process of vegetation succession, taking up to 20-30 years or more to achieve canopy closure.

The Idaho Department of Fish and Game recommends native grass seeding on the areas burned for wildlife browse improvement. That may be accomplished to a certain degree, in the case of sites that are accessible. Some sites are too steep for people to walk and carry seed; helicopters may not be effective for spreading seed because grass seed is very light, helicopters create a lot of wind, and the helicopters cannot fly very close to the ground for safety reasons.

Some documented species-specific effects from fire include:

Spotted knapweed plants present before burning may re-sprout from root crowns and seedlings may emerge from the seedbank or invade bare ground from an off-site seed source following fire. The observed response of spotted knapweed to fire may vary according to region, with the density of the infestation, and depending on the severity and timing of the fire (low- versus high-severity fire microsites, spring versus fall burns) (USFS 2003).

Canada thistle varies in its response to fire—depending on vegetation and site characteristics, as well as frequency, severity, and season of burning. Fire can result in adverse effects (slight damage) to beneficial effects (enhancing) for Canada thistle plants, which can survive fire and re-sprout from its extensive perennial root system and can colonize bare ground via seedling establishment after fire. Several studies have indicated the presence of Canada thistle in burned areas, where it was absent from the pre-fire community and/or adjacent unburned areas (USFS 2003).

Fire is generally considered to encourage the establishment, vegetative spread, and increased density of St. John's wort patches—by stimulating germination of St. John's wort seed and sprouting in surviving St. John's wort roots and root crowns. Several references indicate that St. John's wort often occurs in previously burned areas, especially forested areas (USFS 2003).

Weed treatment and prevention

Weed treatment and prevention would be performed according to the St. Joe Noxious Weed Control Final Environmental Impact Statement and Record of Decision (USDA Forest Service, 1999). As described in

this document, integrated weed control methods would be used, including herbicide spraying, manual, cultural (seeding/fertilizing) and biological methods. Weed treatment and prevention measures would reduce, but not eliminate, the risk of weed spread in the project area.

Tree planting, gopher control bating, and future non-commercial thinning.

Tree planting, gopher bait pesticide application, and non-commercial thinning would have no effect on noxious weeds because their implementation would cause minimal, if any, ground disturbance.

Cumulative Effects

The Proposed Action would directly and indirectly increasing the risk of weed introduction and spread. Effects to weeds from the Proposed Action are primarily indirect and cumulative, rather than direct.

The proposed activities would likely increase the potential for existing weed populations in the project area to expand away from their current locations (e.g., roads, trails, trailheads, concentrated recreation areas) into adjacent treatment areas (where regeneration harvest, new road construction, or broadcast burning is proposed). The degree of disturbance caused by project activities also increases the risk of introduction of new weeds being introduced to and becoming established in the project area, especially in view of the predominance of regeneration harvest and ground-based logging, as well as the 40+ acre openings.

When considered together with past, present, and reasonably foreseeable activities, the overall cumulative effects of the proposed project in the short term are expected to represent a moderate risk of the introduction/ establishment of new weed species to the project area and a moderate-high risk of the spread of existing weed infestations.

Regulatory Framework and Compliance

The Proposed Action includes provisions for minimizing weed introduction and, as such, would comply with requirements of federal and state policies, direction, plans, laws, and executive orders discussed below.

National Forest Management Act and the 2015 Forest Plan

The National Forest Management Act requires projects to be consistent with the Idaho Panhandle National Forest Land and Resource Management Plan (2015 Forest Plan). The 2015 Forest Plan provides guidance for project-level analysis. The plan lists the following direction for non-native invasive plants:

Desired Condition

FW-DC-VEG-10.

Newly invading, non-native invasive plant species are treated and populations are contained or eradicated. The weed program on the Forest uses integrated pest management approaches, including prevention and control measures that limit introduction, intensification, and spread due to management activities. Agreements with cooperative weed management areas assist in control efforts across jurisdictional boundaries (p. 14 of 2015 Forest Plan).

The St. Joe RD has an active weed management program that uses a variety of treatment methods—including herbicide, mechanical, cultural, and biological to achieve results. All treatments are monitored

for effectiveness. The District is an active member of the Inland Empire Cooperative Weed Management Area (IECWMA), a group of federal, state and local agencies combined with private citizens to work together on noxious weed issues, education, and control. With participation of group members and availability of Idaho State Department of Agriculture grant funds, more work can be accomplished than individual entities acting alone.

Objectives

FW-OBJ-VEG-02.

Non-native Invasive Plant Species – Over the life of the Plan, the outcome per decade is: (1.) All sites that are discovered with newly invading non-native invasive species are treated. (2.) The treatment of approximately 15,000 to 30,000 acres to reduce non-native invasive plant density, infestation size, and/or occurrence (these areas are also included in FW-OBJ-VEG-01) (p. 19).

The District treats invasive plant infestations each year as part of the Idaho Panhandle National Forests targets and objectives. New invader species are given the highest priority. Botanical surveys of the project area contain records of all plant species encountered, including non-native invasive plants (BOT-004 TES Plants Survey Documentation). No new invader species were discovered, but, if found, they would be given the highest priority for treatment. Houndstongue is a priority weed on the District; see above discussion regarding its treatment.

Executive Orders

The Invasive Species EO 13112, of February 3, 1999, was enacted to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

The Forest Service analyzes effects to the environment caused by management activities. Design criteria used in all projects minimize weed introduction and spread.

State and Local Law

Under the Idaho Noxious Weed Law (Idaho Code 24 Chapter 22) land owners and managers are required to control State listed noxious weeds on their property.

The St. Joe RD has an active Invasive Plant Management Program. Weed treatment is conducted annually across a variety of treatment sites, including road rights of way, trails, administrative sites, and recreation areas. The District is dedicated to weed prevention and uses design criteria to reduce the risk of weed introduction and spread with all projects permitted or implemented.

National Forest System Invasive Species Management Record Keeping Business Rules and National Standards (v04.01.2012)

In accordance with Forest Service Manual 2903 (Invasive Species Management) – Policy #14, which requires monitoring of weed treatment, all herbicide applications associated with the project would be monitored and reported in the NRM database and contract inspection reports.

References

- Callihan, Robert H. and Timothy W. Miller. 1997. *Idaho's Noxious Weeds*. Noxious Weed Advisory Council, Idaho Department of Agriculture. Boise, Idaho. 74 pages.
- Gelbard, Johnathan L., and Jayne Belnap. 2003. Roads as Conduits for Exotic Plant Invasions in a Semiarid Landscape. *Conservation Biology*. Volume 17, pp. 420-432.
- Heise, Josh. 2017 (St. Joe RD Weed Control Technician). *Manhattan Timber Sale – Post Houndstongue Control 2015-2017*. Digital report in Homestead Botany-Weeds Project Record.
- Idaho Department of Lands. 1992. Rules and Regulations: Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code. Boise, Idaho.
- Lacey, C.A., J.R. Lacey, P.K. Fay, J.M. Story and D.L. Zamora. 1995. Controlling Knapweed on Montana Rangeland. *Circular 311*. Extension Service, Montana State University, Bozeman, Montana.
- Planty-Tabacchi, Anne-Marie. 1996. Invasibility of Species Rich Communities in Riparian Zones. *Conservation Biology* 10:2:598-607.
- Quigley, Thomas M. and Sylvia J. Arbelbide, tech. eds. 1997. *An assessment of ecosystem components in the Interior Columbia Basin and portions of the Klamath and Great Basins*. Gen. Tech. Report PNW-GTR-405. Portland, Oregon: USDA Forest Service, Pacific Northwest Research Station. Volume II, pp. 602-610 and 783-795.
- Quigley, Thomas M. Richard W. Haynes and Russell T. Graham, tech. eds. 1996. *Integrated scientific assessment for ecosystem management in the Interior Columbia Basin and portions of the Klamath and Great Basins*. Gen. Tech. Report PNW-GTR-382. Portland, Oregon: USDA Forest Service, Pacific Northwest Research Station. Volume II, pp. 111-120.
- Rice, Peter and Chris Toney. 1997. Susceptibility of northern region habitat types to invasion by five noxious weed species - first approximations. USDA Forest Service, Northern Region. Missoula, Montana. Unpublished.
- Roche, C.T., and B.F. Roche, 1991. Meadow Knapweed Invasion in the Pacific Northwest, USA, and British Columbia, Canada. *Northwest Science* 65:53-61.
- Trombulak, and Frissell. 2000. Review of the ecological effects of roads on terrestrial and aquatic communities. *Conservation Biology* 14(1): 18-30.
- The Federal Noxious Weeds Act of 1974. P.L. 93-629.
- USDA Forest Service. 2015. Idaho Panhandle National Forests Land Management Plan. 2015 Revision. Coeur d'Alene, Idaho.
- USDA Forest Service. 2004. Fire Effects Information Database.
- USDA Forest Service. 2000. Noxious Weeds Final Environmental Impact Statement and Record of Decision. Idaho Panhandle National Forests, Coeur d'Alene River Ranger District. 58 p. plus Appendices.
- USDA Forest Service. February, 1998. Toward An Ecosystem Approach: An Assessment of the Coeur d'Alene River Basin. USDA Forest Service, Idaho Panhandle National Forests. Ecosystem Paper #4.

Homestead Project: Weeds Risk Analysis

USDA Forest Service, 1989. Idaho Panhandle National Forest Weed Pest Management. Final Environmental Impact Statement. Idaho Panhandle National Forests, Coeur d'Alene, Idaho.

USDA Forest Service. 1987. Idaho Panhandle National Forests Forest Plan. Final Environmental Impact Statement. Idaho Panhandle National Forests Supervisor's Office, Coeur d'Alene, Idaho. 88 p. plus Appendices.

USDA Forest Service Handbook #3409.11: Forest Pest Management with Amendments and Supplements. June 1986.

Vallentine, J.F. 1989. *Range Development and Improvements*. Academic Press Inc., San Diego, CA. 524 p.

Whitson, T.D., (Ed.), 1992. *Weeds of the West*. The Western Society of Weed Science, Newark, California. 630 p.

Zack, A. 1999. Personal communication with Art Zack, Idaho Panhandle National Forests Ecologist, regarding the effects of forest succession on noxious weed populations.

Appendix 1: Non-native, invasive terrestrial plant species targeted for control measures on the Idaho Panhandle National Forests

SCIENTIFIC NAME	COMMON NAME
POTENTIAL INVADERS (CURRENTLY ABSENT)¹	
<i>ACHILLEA NOBILIS</i>	NOBLE YARROW
<i>ALLIARIA PETIOLATA</i>	GARLIC MUSTARD
<i>ANCHUSA ARVENSIS</i>	SMALL BUGLOSS
<i>BASSIA SCOPARIA</i>	BURNING BUSH
<i>BUTOMUS UMBELLATUS</i>	FLOWERING RUSH
<i>CAMPANULA RAPUNCULOIDES</i>	CREEPING BELLFLOWER
<i>CONVOLVULUS ARVENSIS</i>	FIELD BINDWEED
<i>EUPHORBIA MYRSIPNITES</i>	MYRTLE SPURGE
<i>NARDUS STRICTA</i>	MATGRASS
<i>POLYGONUM SACHALINENSE</i>	GIANT KNOTWEED
<i>SALVIA AETHIOPIS</i>	MEDITERRANEAN SAGE
<i>SOLANUM ROSTRATUM</i>	BUFFALOBUR
<i>SORGHUM HALEPENSE</i>	JOHNSONGRASS
<i>TAMARIX SP.</i>	SALT CEDAR COMPLEX
<i>TRIBULUS TERRESTRIS</i>	PUNCTUREVINE
NEW INVADERS	
<i>ACROPTILON REPENS</i>	RUSSIAN KNAPWEED
<i>ANCHUSA OFFICINALIS</i>	COMMON BUGLOSS
<i>ARCTIUM MINUS</i>	COMMON BURDOCK
<i>BARBAREA VULGARIS</i>	GARDEN YELLOWROCKET
<i>BERTEROA INCANA</i>	HOARY ALYSSUM
<i>CARAGANA ARBORESCENS</i>	SIBERIAN PEA SHRUB
<i>CARDARIA DRABA</i>	HOARY CRESS, WHITETOP
<i>CARDUS NUTANS</i>	MUSK THISTLE
<i>CENTAUREA DIFFUSA</i>	DIFFUSE KNAPWEED
<i>CENTAUREA SOLSTITALIS</i>	YELLOW STAR THISTLE
<i>CHAENORHINUM MINUS</i>	DWARF SNAPDRAGON
<i>CHONDRILLA JUNCEA</i>	RUSH SKELETONWEED
<i>CRUPINA VULGARIS</i>	COMMON CRUPINA
<i>CYTISUS SCOPARIUS</i>	SCOTCH BROOM
<i>DIGITALIS PURPUREA L.</i>	FOXGLOVE
<i>ECHIUUM VULGARE</i>	BLUEWEED, TEXAS BLUEWEED
<i>ELAEAGNUS ANGUSTIFOLIA</i>	RUSSIAN OLIVE

Homestead Project: Weeds Risk Analysis

<i>EUPHORBIA ESULA</i>	LEAFY SPURGE
<i>FALLOPIA X. BOHEMICA</i> , <i>F. JAPONICA</i> (PREV. <i>POLYGONUM CUSPIDATUM</i> , <i>P. JAPONICA</i>)	BOHEMIAN OR JAPANESE KNOTWEED
<i>HYPOCHAERIS RADICATA</i>	SPOTTED CAT'S EAR
<i>IRIS PSEUDACORUS</i>	YELLOW-FLAG IRIS
<i>ISATIS TINCTORIA</i>	DYER'S WOAD
<i>JACOBAEA VULGARIS</i> (PREV. <i>SENECIO JACOBAEA</i>)	TANSY RAGWORT
<i>KNAUTIA ARVENSIS</i>	FIELD SCABIOUS
<i>KOCHIA SCOPARIA</i>	KOCHIA
<i>LEPIDIUM DRABA</i> (PREV. <i>CARDARIA DRABA</i>)	HOARY CRESS, WHITETOP
<i>LEPIDIUM LATIFOLIUM</i>	PERENNIAL PEPPERWEED
<i>LYTHRUM SALICARIA</i>	PURPLE LOOSESTRIFE
<i>MYRIOPHYLLUM SPICATUM</i>	EURASIAN WATERMILFOIL
<i>ONOPORDUM ACANTHIUM</i>	SCOTCH THISTLE
<i>POTENTILLA ARGENTEA</i>	SILVERY CINQUEFOIL
<i>RANUNCULUS ACRIS</i>	TALL BUTTERCUP
<i>SOLANUM DULCAMARA</i>	CLIMBING NIGHTSHADE
<i>SOLANUM ELAEAGNIFOLIUM</i>	SILVERLEAF NIGHTSHADE
<i>TRIFOLIUM ARVENSE</i>	HARE'S FOOT CLOVER
<i>TRIPLEUROSPERMUM MARITIME</i>	SCENTLESS CHAMOMILE
WIDESPREAD WEEDS³	
<i>ARTEMISIA ABSINTHIUM</i>	ABSINTH WORMWOOD
<i>BROMUS TECTORUM</i>	CHEATGRASS
<i>CENTAUREA DEBEAUXII</i> (PREV. <i>C. NIGRESCENS</i>)	MEADOW KNAPWEED
<i>CENTAUREA STOEBE</i>	SPOTTED KNAPWEED
<i>CICHORIUM INTYBUS</i>	CHICORY
<i>CIRSIUM ARVENSE</i>	CANADA THISTLE
<i>CIRSIUM VULGARE</i>	BULL THISTLE
<i>CONIUM MACULATUM</i>	POISON HEMLOCK
<i>CYNOGLOSSUM OFFICINALE</i>	HOUNDSTONGUE
<i>HIERACIUM AURANTIACUM</i>	ORANGE HAWKWEED
<i>HIERACIUM CAESPITOSUM</i>	MEADOW/YELLOW HAWKWEED COMPLEX
<i>HYPERCIUM PERFORATUM</i>	ST. JOHNSWORT
<i>LATHYRUS LATIFOLIUS</i>	PERENNIAL PEA
<i>LEUCANTHEMUM VULGARE</i>	OXEYE DAISY
<i>LINARIA DALMATICA</i>	DALMATIAN TOADFLAX
<i>LINARIA VULGARIS</i>	YELLOW TOADFLAX
<i>MATRICARIA DISCOIDEA</i>	PINEAPPLE WEED

Homestead Project: Weeds Risk Analysis

<i>MELILOTUS OFFICINALIS</i>	WHITE AND YELLOW SWEET CLOVER
<i>PHALARIS ARUNDINACEA</i>	REED CANARY GRASS
<i>POTENTILLA RECTA</i>	SULFUR CINQUEFOIL
<i>SISYMBRIUM ALTISSIMUM</i>	TUMBLE MUSTARD
<i>SONCHUS ARVENSIS</i>	PERENNIAL SOWTHISTLE
<i>TANACETUM VULGARE</i>	COMMON TANSY
<i>VERBASCUM THAPSUS</i>	MULLEIN
<i>VERONICA CHAMAEDRYIS</i>	GERMANDER SPEEDWELL
<i>VERONICA OFFICINALIS</i>	COMMON SPEEDWELL

1. Potential invaders: Goal is to prevent and eradicate promptly if found
2. New invaders: Goal is to eradicate small new infestations and reduce larger infestations
3. Widespread weeds: Goal is to contain inside infested area and reduce plant populations